On the identity of *Cethosia biblis sandakana* Fruhstorfer 1899 described from North Borneo (Lepidoptera: Nymphalidae)

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Abstract: In this paper on North Bornean and Philippine representatives of the nymphalid species *Cethosia biblis* (Drury 1773) two of the described subspecies are dealt with: *Cethosia biblis sandakana* Fruhstorfer 1899 and *Cethosia biblis barangingi* Tsukada 1985. *C. b. sandakana* was described from Sandakan, North Borneo, and (probably erroneously) from Kinabalu; *C. b. barangingi* from the Sulu Archipelago. Both taxa have identically marked females of varied shades of green and — additionally — the males are also identical in their colour, pattern and genitalia. So in our opinion they represent one and the same subspecies with *barangingi* being a **new synonym** of *sandakana*. Thus the distribution of ssp. *sandakana* now includes the Sulu Archipelago, but it is not found in the Central Philippines as previously published as ssp. *sandakana*.

Zur Identität von *Cethosia biblis sandakana* Fruhstorfer 1899 von Nordborneo (Lepidoptera: Nymphalidae)

Zusammenfassung: In dem vorliegenden Beitrag über die nordborneensischen und philippinischen Vertreter der Nymphalidenart *Cethosia biblis* (Drury 1773) werden zwei Unterarten dieses Taxon vorgestellt: *Cethosia biblis sandakana* Fruhstorfer 1899 und *Cethosia biblis barangingi* Tsukada 1985. Die erstere wurde von Sandakan, Nordborneo, und (vermutlich irrtümlich) vom Kinabalu beschrieben, während die zweite vom Suluarchipel, Philippinen, stammt. Beide Taxa haben identisch gezeichnete, blaßgrüne Weibchen, und auch die Männchen sind in Färbung und Zeichnung gleich. Nach unserer Meinung repräsentieren sie ein und dieselbe Unterart mit dem Taxon *barangingi* als einem **neuen Synonym** von *sandakana*. Damit umfaßt die Verbreitung von ssp. *sandakana* auch den Suluarchipel der südlichen Philippinen; sie fehlt jedoch den zentralen Philippinen, wie es kürzlich publiziert worden ist.

Introduction

The species *Cethosia biblis* (Drury 1773) has a very wide distribution in a number of subspecies stretching from India, South China, former Indochina to Malaysia, Indonesia, the Philippines and on to the Moluccas and Ambon. These were divided by Küppers (2006a: 6) into 5 complexes of which for this paper the Sunda and Philippine population complexes concern this project (Fig. 1). From North Borneo, Fruhstorfer (1899) described *Cethosia biblis sandakana* listing his type series as originating from the Sandakan and Kinabalu areas with the ♂ being similar to the Philippine *Cethosia eurymena* Felder & Felder 1867 (later a synonym of *Cethosia biblis insularis* Felder & Felder 1861) while the ♀ had a light green base colour. In 1929 Hall published a further *Cethosia biblis* subspecies as *woolletti* (with a red ♀) as occurring over North Borneo including Sabah (Figs. 2, 3), thus giving 2 subspecies for Sabah. Later, Tsukada (1985: 282) established *Cethosia biblis sandakana* as occurring in the Central Philippines and questioned whether it ever really occurred in North Borneo. However, he did illustrate a ♂ ssp. *sandakana* from North Borneo dated 1933 but with a question mark. Interestingly, Fruhstorfer *in* Seitz (1912: 501) stated "*sandakana* has hitherto been found only in the most northerly portion of Borneo where it represents a purely Philippine element in the fauna of that island, being a relic from the time when Borneo was connected by land with Mindanao".

Off the extreme western end of the Philippine Sulu Archipelago exists a group of islands which are located within Sabah and have been given the name Tun Sakaran Park. They are located offshore from the Sabah mainland town of Semporna. For this report these islands will be referred to as the "Semporna Offshore Islands".

In 1998 and 2006 on the Semporna Offshore Islands, the 2 larger islands named Bod Gaya and Bohey Dulang, *Cethosia biblis* were collected which possessed a ♂ similar to *Cethosia biblis insularis* and a green ♀. These Semporna Offshore Islands are situated approximately 160 km SSE from Sandakan, Sabah, and 70 km W from Sibutu Island belonging to the Philippine Sulu Archipelago. This *Cethosia biblis* from Bohey Dulang and Bod Gaya matches Fruhstorfer's description of his *Cethosia biblis sandakana*. Further, we can now clearly demonstrate that Fruhstorfer's subspecies *sandakana* from extreme NE Borneo not only occurs in Sabah, but is identical to the *Cethosia biblis* on the Philippine Sulu Archipelago described by Tsukada (1985: 198) as subspecies *barangingi* which must now be considered a synonym of ssp. *sandakana.* We believe that Tsukada's placing of ssp. *sandakana* in the central Philippines is quite incorrect, nonetheless this subspecies does exist in the Philippines in the Sulu Archipelago.

Abbreviations used

CCGT	Collection Colin G. Treadaway, Limbach-Wagenschwend; will be incorporated into Senckenberg-Museum, Lepidoptera collection.
CSFM	Coll. Sabah Forestry Museum, Mt. Kinabalu Park HQ.
lfw.	Length of forewing.

Notes on the taxon *Cethosia biblis sandakana*

1. Examples of *Cethosia biblis sandakana* are difficult to locate in European museums. Only a few ♂♂ are known with rather vague locations of capture. As stated by Fruhstorfer (1899) in his original description of

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Fig. 1: Map of NE Sabah and the western end of the Philippine Sulu Archipelago showing Sandakan, Bohey Dulang and Bod Gaya Islands (black triangles) and the border lines between Sabah (in the West), Kalimantan (in the South), and the Philippines (in the East and North). — Map from Online Map Creation Dr. Martin Weinelt, www.aquarius.ifm-geomar.de, modified and supplemented.

ssp. *sandakana*, the ♂♂ are very similar to the ♂♂ of the Philippine *Cethosia eurymena* (= *C. biblis* ssp. *insularis*) (Figs. 4, 5). Based on the large collection of *Cethosia biblis* we have from many islands of the Philippines, we have noted a certain amount of variation in ♂♂ in specimens from the same islands. The Senckenberg-Museum in Frankfurt am Main possesses one ♂ with a label that reads only "*sandakana* Fruh.". The Natural History Museum, London, has 2 ♂♂, one listed as Sandakan, North Borneo, Honrath Collection, and the other listed as Marinduque, an island just south of Luzon, Philippines (information from P. R. Ackery). The Humboldt-Museum Berlin has two ♂♂, one with a label identifying it as a ♂ of Fruhstorfer's *sandakana* type series, Sandakan, North Borneo (checked by W. A. Nässig). In the Leiden Museum no subspecies *sandakana* were located (information from R. de Jong).

2. Museums in Malaysia were checked for specimens of subspecies *sandakana*, specifically the university collections in Sarawak, Sabah and Kuala Lumpur (checked with F. Abang), without finding any ssp. *sandakana*. However, the Sabah Forestry Museum on Mt. Kinabalu possesses a fine series of ♂♂ and ♀♀, identified as *sandakana* from the Semporna Offshore Islands.

3. Fruhstorfer listed in his description of *Cethosia biblis sandakana* the collecting locations as being Sandakan and Kinabalu. It is possible that the Kinabalu specimen

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Figs. 2–15: *Cethosia biblis* subspecies. — **Figs. 2–3:** *C. b. woolletti*. **Fig. 2:** ♂, Sabah, Mahua Tanburn, 8. IX. 1999 (CSFM). **Fig. 3:** ♀, Sabah, Keningau, Crocker Range Park, 16. VII. 1999 (CSFM). — **Figs. 4–7:** *C. b. insularis*. **Fig. 4:** ♂, dorsal, Mindoro, lower slopes of Mt. Halcon, 14. VI. 2007; lfw. 37 mm. **Fig. 5:** same specimen, ventral. **Fig. 6:** ♀, dorsal, same locality, 6. VI. 1979 ; lfw. 42 mm. **Fig. 7:** same specimen, ventral. — **Figs. 8–11:** *C. b. sandakana,* Malaysia. **Fig. 8:** ♂, dorsal, Sabah, Pulau Bohey Dulang, Taman Marin, Tun Sandakan, 6. VII. 2006; lfw. 35 mm (Coll. S. DUNSUL). **Fig. 9:** same specimen, ventral. **Fig. 10:** ♀, dorsal, same locality, 6. VII. 2006; lfw. 38 mm (Coll. S. DUNSUL). **Fig. 11:** same specimen, ventral. — **Figs. 12–15:** *C. b. sandakana* (= *C. b. barangingi,* n. syn.), Philippines, Sulu Archipelago. **Fig. 12:** ♂, dorsal, Sanga Sanga Is., Sitampah, 9. II. 1989; lfw. 34 mm. **Fig. 13:** same specimen, ventral. **Fig. 14:** ♀, dorsal, Tawitawi Is., Tarawakan, 11. II. 2006; lfw. 42 mm. **Fig. 15:** same specimen, ventral. — Figs. 2, 3: M. PAGE, all other: C. G. TREADAWAY. Specimens in CCGT, except where indicated otherwise. — Specimens not exactly to the same scale.

was misidentified by FRUHSTORFER. *Cethosia biblis woolletti* was not known at that time being first published in 1929. Certainly from the underside, with closed wings, if not set, it would look very similar to *Cethosia biblis sandakana*.

4. Over recent years, a very large number of *biblis* specimens have been collected in the central Philippines from which it could be clearly established that in this area, where TSUKADA (1985) designated the *biblis* subspecies as *sandakana*, no green ♀♀ as described by FRUHSTORFER have ever been collected.

5. In OTSUKA's 1988 book a *Cethosia biblis* ♂ and ♀ are illustrated which are clearly *Cethosia biblis woolletti*, not as listed in the text as *C. biblis sandakana.*

6. A collection of 136 butterflies covering 33 species was made on Bohey Dulang and Bod Gaya between 7.– 12. IX. 1998 and again from 14.–18. XII. 1998 by Maklarin LAKIM and Sinail DUNSUL from the Research and Education Division of Sabah Parks. A further expedition was made in VII. 2006. An article was published by LAKIM et al. (2003) covering their expeditions. In their checklist of identified butterflies from the Semporna Offshore Islands of Bohey

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Dulang and Bod Gaya they included rightfully *Cethosia biblis sandakana*. This identification was based on the green ♀♀ collected.

7. A careful comparison to our series of Philippine Sulu Archipelago *Cethosia biblis barangingi* Tsukada 1985 clearly demonstrates that this subspecies is identical to Fruhstorfer's subspecies *sandakana* (genitalia and markings); *barangingi* must therefore be transferred into synonymy of *sandakana.* Thus, although subspecies *sandakana* does not occur in central Philippines as Tsukada (1985) stated, it can be commonly found on the Sulu Archipelago from Jolo to Sibutu as well as the Semporna Offshore Islands.

Redescription of *Cethosia biblis sandakana* Fruhstorfer 1899

loc. typ. restricted: [Borneo, Sabah], Sandakan (Figs. 8–11).
= *Cethosia biblis barangingi* Tsukada 1985; loc. typ.: [Sulu Archipelago], Jolo Is., **n. syn.** (Figs. 12–15).

Distribution: Bohey Dulang and Bod Gaya Islands located ca. 160 km SSE of Sandakan, Sabah, Malaysia, and additionally the Philippine Sulu Archipelago from Jolo to Sibutu.

Fwl. ♂: 34–37 mm; ♀ 38–42 mm. For the ♂ upperside the base colour is red with a large black subapical area extending along the outer margin for the forewing which includes 2 discrete submarginal bands, one of white spots outwardly positioned, the other of light white, helmet-shaped markings. Additionally, there is at approximately $^{5}/_{8}$th of the length of the forewing costa a white patch consisting of 2 parallel 4 mm bars offset from each other by approximately 25%. Further, discally from this white patch, there is almost always a small white dot. The red marked cell area is crossed by a series of black lines. For the hindwing there is a submarginal black band 4–5 mm wide followed inwardly by a row of black lines interrupted by the veins and postdiscally a further row of black spots placed also between the veins.

The underside is very colourful and typical for Philippine *Cethosia biblis* with the inner basal part of the hindwing and forewing red with alternative black and white bands interrupted discally by a broader irregular white band edged both sides with black. This is followed outwardly by two ochre bands interrupted by a series of black spots and dots on a narrow white band. The fore- and hindwings' marginal areas are decorated with a fine white zigzag line edged both sides with black.

The ♀ has for base colour on the upperside varied shades of green with a large subapical black area extending along the outer margin for the forewing similar to the ♂ in that the black area is interrupted by two lightly marked white bands of faint spots and helmet shapes. Just as for the ♂, the forewing cell area is crossed by a series of black lines but on a green background rather than the red for the ♂. The forewing has a similar white costa patch as the ♂. The ♀ hindwing upperside black submarginal area is also similar to the ♂, but the bands of dots and lines appear on varied shades of green background. Very occasionally ♀♀ occur with the green base colour replaced by brown.

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